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A new species of *Stenobiella* Tillyard (Neuroptera, Berothidae) from Australia

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Abstract

Stenobiella variola **sp. n.**, a new species of beaded lacewing (Neuroptera: Berothidae), is described and figured from south-eastern Australia. A preliminary key to *Stenobiella* species is presented.

Keywords

Berothidae, Neuroptera, lacewing

Introduction

Beaded lacewings (Berothidae) are a small family of Neuroptera comprising approximately 100 species occurring throughout most biogeographical regions. Members of the family are recognised by elongation of the pronotum, female usually with hypocaudae and substantial cubital veins in both wings. The larvae are associated with termites, and undergo a degree of hypermetamorphosis during development (Brushwein, 1987).

Four subfamilies of Berothidae are recognised: Rhachiberothinae, Cyrenoberothinae, Berothinae and Nosybinae (Aspöck, 1986; MacLeod and Adams, 1967; New,

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1989). Rhachiberothinae have been considered by some authors as a separate family (Aspöck and Mansell, 1994) or as a subfamily of Mantispidae (Willmann 1990). A fifth subfamily, Nyrminae, was erected by Aspöck (1989) based on a highly autapomorphic species (*Nyrma kervillea* Navás) previously placed in Hemerobiidae. Penny and Winterton (2007) recently rediscovered the enigmatic genus *Ormiscocerus* Blanchard from Chile and placed it in Cyrenoberothinae based on various wing and genitalic characteristics; a placement also supported in phylogenetic analyses by Winterton et *al.* (2010). Like *Nyrma* Navás, *Ormiscocerus* was also previously placed in Hemerobiidae and the wing venation of both species show numerous similarities, indicating that *Nyrma* should be placed in Cyrenoberothinae rather than as a separate subfamily. In a cladistic analysis of Berothidae using morphology Aspöck and Nemeschkal (1998) proposed a major reordering of the internal hierarchy and classification of the family with five subfamilies (Cyrenoberothinae, Trichomatinae, Protobiellinae, Nosybinae and Berothinae).

Stenobiella Tillyard (Berothinae) is an endemic Australian genus originally described based on two species (*S. hirsutissima* Tillyard and *S. gallardi* Tillyard) from Queensland and New South Wales (Tillyard, 1916). Kimmins (1930) described a third species of (*S. pulla* Kimmins) from the Northern Territory and Aspöck and Aspöck (1984) subsequently described seven new species, bringing the total number of species to 10. An eleventh species is described and figured herein (*Stenobiella variola* sp. n.) from western New South Wales. A preliminary key to species is presented.

Methods

Genitalia were macerated in 10% KOH at room temperature for one day to remove soft tissue, then rinsed in distilled water and dilute acetic acid and dissected in 80% ethanol. Preparations were then placed into glycerine, with images made with the aid of a digital camera mounted on a stereomicroscope. Genitalia preparations were placed in glycerine in a genitalia vial mounted on the pin beneath the specimen. Terminology follows MacLeod and Adams (1967) and Aspöck and Aspöck (1984). Specimen images were taken using a digital camera with a series of images montaged using Helicon Focus (©HeliconSoft) and links provided to Morphbank for high-resolution images. All new nomenclatural acts and literature are registered in Zoobank[1] as per the recent proposed amendment to the International Code of Zoological nomenclature for a universal register for animal names (Polaszek et *al.,* 2005a,b; Pyle et *al.,* 2008; ICZN, 2008).

[1] http://www.zoobank.org/

Taxonomy

***Stenobiella variola* sp. n.**
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Figs 1–3

Holotype male, AUSTRALIA: New South Wales: Tintinallogy Station, 15.i.2010, light sheet, -31.9994°, 143.01706°, S.L. Winterton & N.B. Hardy, light sheet (Australian National Insect Collection).

Paratypes. AUSTRALIA: New South Wales: 2 males, 1 female, same data as holotype (California Academy of Science Collection).

Diagnosis. Distinctively contrasted variegated wing pattern; numerous white non-tapered setae on wings and body, pale patch basally in pterostigma, darker distally; dark scale-like setae absent from wings and abdomen; dark, elongate setae absent from mid coxa; single R_1-Rs cross-vein; dark, elongate setae along entire posterior margin of both wings; female hypocaudae well developed; male paramere-mediuncus complex relatively large.

Description. Body length = 5.0–6.0 mm (male), 6.1 mm (female). *Head.* Black to light brown; anterior tentorial pits distinct; clypeus with dark band and minute pale pubescence; vertex irregularly covered with elongate, non-tapered white setae, multi-directional and partially appressed; raised lateral tubercle with elongate white setae admixed with several longer and more tapered black setae; antenna dark brown to black, scape covered with elongate white setae admixed with dark setae; pedicel with ring of

Figure 1. *Stenobiella variola* sp. n. Female habitus. Photo credit: Shaun L. Winterton.

Figure 2. *Stenobiella variola* sp. n., **A** forewing **B** hindwing. Scale line = 0.5 mm.

dark setae basally, closely approximating a distal ring of white setae; 51 flagellomeres covered with fine dark setae; mouthparts brown with sparse black setae.

Thorax. Pronotum wider than long, dark brown; two latitudinal depressions extending from midline, each with white setae along length; white setae along midline and around margin; admixed with slightly longer and tapered black setae along lateral and anterior margins; mesonotum light brown, blackish posterolaterally, white setae anteromedially in 'V' pattern, admixed with patch of dark setae; dark area glabrous; metathorax light brown with dark patches laterally, posterior portio with tapered pale setae; pleuron with extensive white, non-tapered setae. *Wing* (Figure 2). Forewing length = 6.1 mm. Hind wing length = 5.2 mm. Forewing hyaline with extensive infuscate mottling; venation brown and tan mottled, numerous dark tapered macrosetae along wing veins with infuscate area around base of each seta; rows of white non-tapered setae extensive along all wing veins, admixed with dark, non-tapered setae, distribution of white and dark non-tapered setae relative to surrounding infuscation (i.e. more white setae in hyaline areas); costal and subcostal areas with extensive infuscation, white areas along costal margin with dark mark basad of pterostigma; pterostigma dark with white either side; dark, elongate along entire posterior margin of wing; single cross-vein between R_1 and anterior trace of Rs; 4–5 gradate series cross-veins; distal CuA-MP cross-vein perpendicular to CuA and originating on anterior branch of distal CuA fork; hindwing hyaline; venation light brown to yellow; macrosetae absent, extensive fine tapered setae on all veins, more numerous in distal

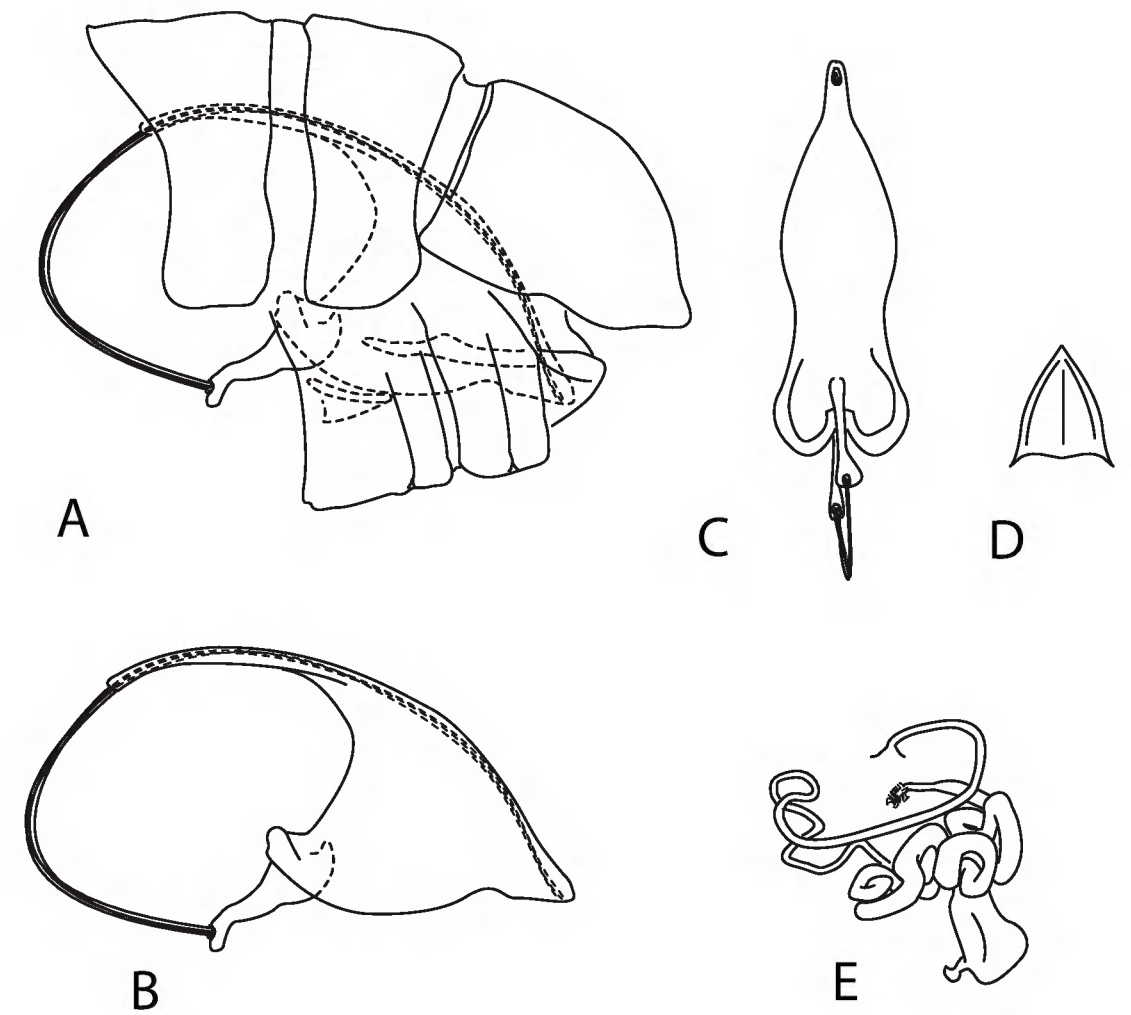

Figure 3. *Stenobiella variola* sp. n., Male genitalia: **A** Genital segments, lateral **B** paramere-mediuncus complex, lateral **C** same, ventral **D** hypandrium internum, ventral. Female genitalia: **E** spermatheca, ventral. Scale line = 0.2 mm.

area of wing and much longer along entire posterior margin of wing. *Legs*. Uniform dark brown with extensive covering of elongate, white setae; setae shorter and darker on tarsomeres.

Abdomen. Uniform brown to light brown; extensive pile of dark setae admixed with white setae, denser on sternites; stripe of white, non-tapered setae laterally from segment one to terminalia

Male genitalia (Fig. 3A–D). Tergite 9 + ectoproct rounded posteriorly, slightly acuminate distally; paramere-mediuncus complex very large with well sclerotised guide; hypandrium internum triangular.

Female genitalia (Fig. 3E). Hypocaudae well developed, elongate; spermatheca large and highly convoluted in shape.

Etymology. The specific epithet is derived from Latin, *variola*; spotted, mottled.

Comments. *Stenobiella variola* sp. n. is a distinctive species based on wing mottling and extensive wing and body covering of white, non-tapered setae. The male genitalia are similar in structure to *S. theischingerorum* Aspöck & Aspöck, to which *S. variola* sp. n. appears to be closely related. No key to species of *Stenobiella* exists. The following key is based largely on the published descriptions by Aspöck & Aspöck

(1984) and examination of additional non-type material in various collections; considering the high likelihood of new species being collected, it should be considered preliminary only. Both sexes are required for the key to work most effectively for some species.

Key to *Stenobiella* species

1. Wing mostly or completely pale; relatively large species (ca. 8.0–10.0 mm forewing length); hypocauda present as a relatively short, blunt process **2**
– Wing dark infuscate to stark maculate; size variable, but usually less than 9.0 mm forewing length; hypocauda as elongate process (rarely greatly reduced to a knob) **3**
2. Wing with costal field dark ..... ***S. kaikai* Aspöck & Aspöck**
– Wing uniformly pale..... ***S. arrunja* Aspöck & Aspöck**
3. Male paramere-mediuncus complex relatively small (cf. Aspöck & Aspöck 1984: figs 21, 31)..... **4**
– Male paramere-mediuncus complex relatively large (Fig. 3A–B) **5**
4. Black scale-like setae present on both wings ... ***S. cardaleae* Aspöck & Aspöck**
– Black scale-like setae absent on both wings ..... ***S. muellerorum* Aspöck & Aspöck**
5. Female hypocauda knob-like; spermatheca large; paramere-mediuncus complex shape as in Aspöck & Aspöck (1984: fig. 11)..... ***S. pindana* Aspöck & Aspöck**
– Female hypocauda elongate; spermatheca smaller; paramere-mediuncus complex shape as in Figure 3 A–C **6**
6. Scales on forewing present ..... ***S. moma* Aspöck & Aspöck**
– Scales on forewing absent..... 7
7. Wing largely uniform infuscate but not distinctly maculate ..... ***S. pulla* Kimmins**, ***S. gallardi* Tillyard**, ***S. hirsutissima* Tillyard**
– Wing distinctly maculate **8**
8. Costal field with alternating dark and pale regions to forewing tip (cf. Aspöck & Aspöck 1984: fig. 46–47); hypandrium apex relatively tapered; paramere-mediuncus shape as in Aspöck & Aspöck 1984: figs 3–4 (Northern Territory) ..... ***S. theischingerorum* Aspöck & Aspöck**
– Costal field with alternating dark and pale regions to forewing tip but with distinct pale area midway (Fig. 2A); hypandrium apex not as acutely tapered; paramere-mediuncus shape as in Fig. 3A–C (New South Wales)..... ***S. variola* sp. n.**

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